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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/706,350	11/03/2000	James F. Bredt	Z00837006 GSE	6314

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EXAMINER	
MAKI, STEVEN D	

ART UNIT	PAPER NUMBER
1733	

DATE MAILED: 02/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/706,350	BREDT ET AL.	
	Examiner	Art Unit	
	Steven D. Maki	1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12-12-05,12-5-05,10-28-05*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *85-98 and 124-129* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *85-98 and 124-129* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1) The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2) The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Bredt et al 031

3) **Claims 91, 93, 95, 97, 127 and 128 are rejected under 35 U.S.C. 102(e) as being anticipated by Bredt et al 031 (US 2001/0050031).**

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Claims 85-90, 92, 94, 96, 98, 124-126 and 129 (but not claims 91, 93, 95, 97, 127 and 128) of this application are entitled to the benefit of the filing date of applicant's provisional application 60/164,000 filed 11-5-99.

Claims 91, 93, 95 and 97 are not entitled to the benefit of the filing date of applicant's provisional 60/164,000 filed 11-5-99 because provisional 60/164,000 fails to describe each of the members of the Markush group in claims 91, 93, 95 and 97.

Provisional application 60/164,000 fails for example to describe "polybutylaminoethyl methacrylate", "polyvinyl pyridine" and "ammonimum salt of polyvinylsulfonic acid".

Claims 127 and 128 are not entitled to the benefit of the filing date of applicant's provisional application 60/164,000 filed 11-5-99 because provisional 60/164,000 fails to describe the polymer and metal members of the Markush group and fails to support the diameter range of about 1 to about 300 micrometers.

Accordingly, the earliest filing date claims 91, 93, 95, 97, 127 and 128 are entitled to is 11-3-00.

Since Bredt et al 031 has a different inventive entity than this application and the filing date 4-14-00 is before the filing date 11-3-00, Bredt et al 031 is available as prior art under 35 USC 102(e) against claims 91, 93, 95, 97, 127 and 128.

Claims 91, 93, 95, 97, 127 and 128 are anticipated by Bredt et al 031. Bredt et al 031's method of 3-D printing comprises forming a first layer of particles which can include adhesive and filler, applying a fluid (water) to activate the adhesive, allowing the adhesive to adhere the particles together to form a solid region and then applying a second layer of the particles, applying fluid to the second layer of particles, etc. The **adhesive** can include **anionically ionizable polymer** such as polymethacrylic acid and sodium polystyrene sulfonate and **cationic polymer** such as polyethyleneimine. See at least paragraphs 23 and 24. The adhesive can be included in both the particle mixture and the activating fluid. See paragraph 33. Bredt et al 031 also discloses including filer such as clay (paragraph 21) and using a particle size of 10-300 micrometers (paragraph 34).

Applicant argues that Bredt et al 031 does not anticipate claim 85 because the adhesive taught by Bredt et al 031 is provided in the binder composition, not in the particulate material. Applicant is incorrect. Bredt et al 031 expressly teaches including the adhesive in both the particle mixture and the activating fluid. See paragraph 33.

Bredt et al 798

4) **Claims 85-90, 92-94, 96-98 and 124-129 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bredt et al 798 (WO 98/09798).**

Bredt et al 798 discloses a method of three dimensional printing comprising:

(1) providing a first layer of a mixture of particles (3-D printing composition);

(2) dispensing a fluid onto a first region of the first layer and the first region being contiguous with a second region comprising the mixture of particles;

(3) allowing a solidified material to form in the first region of the first layer;

(4) providing a second layer of the mixture of particles (3-D printing composition) over the first layer;

(5) dispensing a fluid onto a first region of the second layer; and

(6) allowing a solidified material to form in the first region of the second layer.

The mixture of particles comprise particles of adhesive, particles of filler and optionally a fibrous component. The fluid activates the adhesive causing the particles to adhere together and to adhere to the previously formed adjacent layers. See page 4 lines 22-23. At page 6 line 31 to page 7 line 1, Bredt et al 798 describes the adhesive as defining a component that forms the primary adhesive bonds in the mixture of material between portions of the mixture that were separate prior to activation by an activating fluid. At page 8 line 27, Bredt et al 798 describes the activated particles as adhering together. At page 9, Bredt et al 798 describes forming adhesive bonds between the filler and the fiber. At page 9 lines 8-9, Bredt et al 798 teaches that the adhesive bonds

harden, joining the filler and, optionally fiber particulates into a rigid structure. At page 11, Bredt et al 798 describes the filler particles becoming adhesively bonded together. Bredt et al 798 describes the **adhesive** at page 10 line 10 to page 11 line 4. Bredt et al 798 describes the **filler** at page 7 lines 1-3 and page 11 line 5 to line 15. Bredt et al 798 teaches "Compounds suitable for use as the filler of the present invention can be selected from the same general groups from which the adhesive is selected ..." (page 11 lines 60-17). Bredt et al 798 describes the **fibrous component** at page 7 lines 6-8 and page 11 line 22 to page 12 line 3. Bredt et al 798 describes the **fluid** at page 12 line 26 to page 13 line 2. In the example in Table 1, the adhesive is sucrose (sugar) and the filler is maltodextrin (starch).

As to claim 85, the claimed method is anticipated by Bredt et al 798's method of three-dimensional printing. Claim 85 describes "a reaction". At page 7 lines 24-26, the original disclosure broadly defines "Chemically react" as resulting "... in the dissociation and/or formation of chemical bonds such as covalent bonds, ionic bonds, ionic interactions, hydrogen bonding interactions, and the like". In claim 85, the claimed first reactant reads on the adhesive, filler or fiber and the claimed second reactant reads on the adhesive, filler or fiber. For example, the first reactant reads on the adhesive and the second reactant reads on the filler. The step of "allowing a reaction between the first and second reactants to occur" is sufficiently broad to read on the adhering of particles described by Bredt et al 798. For example, the claimed reaction read on the formation of "adhesive bonds" between the adhesive particles and the filler particles. The mixture of particles is a free-flowing particulate. In any event: it would have been

obvious to provide Bredt et al 798's mixture for providing the layers as a "free-flowing particle material comprising a first reactant and a second reactant" since Bredt et al 798 teaches that the mixture comprises a mixture of adhesive particles, filler particles and optionally fibrous component wherein (a) the mixture is described as being a "powder" (page 6 line 21), the adhesive is preferably milled as finely as possible prior to admixture with the filler (page 10 lines 15-16), the filler includes a distribution of particle grain sizes ranging from 20 to 200 micrometers (page 11 lines 10-12) and the fibrous component has a mean length of about 60 to 200 micrometers (claim 27 on page 17).

Applicant argues that the change of states, i.e. changing a powder from a solid to a liquid and then evaporating the liquid is not the equivalent to the reaction between the two particulate components in claim 85. This argument is off-point because the reaction in Bredt et al 798 is the adhesion between the first particles (adhesive) and the second particles (filler) instead the change of states. Adhesion (bonds between the particles) is a reaction within the expansive definition of "Chemically react" on page 7 of the original disclosure.

As to the dependent claims: As to claim 86, the adhesive has "highly solubility", the filler may be "sparingly soluble" (page 11 line 8) and the fiber may be "substantially slower dissolving than the adhesive" (page 11 line 23). As to claims 87-90, 90-94 and 96-98, see the materials disclosed by Bredt et al 798 for the adhesive and filler. For example, Bredt et al teaches that the adhesive may be starch or polyacrylic acid and that the filler may be starch. As claim 124, the claimed "inert" material reads on the fibrous component.

As to claim 127 (organic material or inorganic material), note Bredt et al 798's teachings as to the composition for the filler particles and/or the fibers.

As to claim 128, Bredt et al 798 teaches using a mean diameter of 10 to 300 micrometeres (page 22).

As to claim 129, Bredt et al 798 teaches using water for the fluid. See page 12 line 26 to page 13 line 2.

5) **Claims 85-98 and 124-129 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bredt et al 798 (WO 98/09798) in view of Keegan et al (US 3926870), Nagai et al (US 5096491) or Thuresson (US 6077887).**

Bredt et al 798, which is discussed above, is considered to anticipate claim 85. In any event: it would have been obvious to one of ordinary skill in the art to use a first particulate reactant and a second particulate reactant (as required by claim 85) in the mixture of particles used in Bredt et al's three dimensional printing method since (1) Bredt et al, *directed to three dimensional printing / prototyping*, teaches that the **particulate material** is activated by the fluid so as to become adhesive and that, as the fluid dissolves the adhesive, the fluid viscosity increases dramatically arresting further migration of the fluid from the initial point of impact (page 9 lines 2-4) and (2) (a) **particulate material comprising two reactants (cationic material and anionic material)**, which is activated by fluid so as to become adhesive, is a well known type of adhesive material in the adhesive bonding art as evidenced for example by Keegen et al or Nagai et al or (b) Thuresson teaches using **water soluble anionic polyelectrolyte and water soluble cationic polyelectrolyte** as a thickening agent so as to obtain an

unexpectedly high viscosity increase (col. 6 lines 25-29). Hence, Bredt et al 798 teaches using water activated particulate adhesive in the 3-D printing method and known water activated particulate adhesives comprise first reactant and second reactant as evidenced by Keegen et al or Nagai et al. Bredt et al 798 also teaches that the viscosity of the fluid should increase dramatically after the fluid is applied to the mixture of particles and Thuresson suggests using a first reactant and a second reactant to obtain unexpectedly high viscosity increase. Thuresson also specifically describes anionic material such as copolymers of methacrylic acid with methyl methacrylate and cationic material such as poly(diallyldimethylammonium chloride) (col. 1). No unexpected results over the above applied prior art has been shown.

With respect to Keegan et al, applicant states that Keegan et al does not appear to disclose a reaction between first and second reactants. The examiner disagrees since Keegan et al teaches that adhesive force develops when the mixture of the anhydrous cationic polymer component and the anhydrous anionic protein material is exposed to moisture (col. 2 lines 60-65).

Applicant argues that Keegan does not teach a material suitable for forming an article comprising layers. The examiner disagrees since Bredt et al 798 teaches that an adhesive powder which becomes adhesive when wetted with water is suitable for forming an article having several layers and Keegan et al teaches that the disclosed adhesive powder develops adhesive force when wetted with water.

With respect to Keegan, applicant argues that dental adhesive powders have the property of swelling the many times their volume. Keegan et al is silent as to the

adhesive powder comprising the mixture of cationic material and anionic material having the property of swelling. It is acknowledged that Keegan et al teaches that powdered natural gums have the property of swelling to form a gelatinous mass. See col. 1 lines 17. However, Keegan et al's adhesive powder does not contain natural gum. See examples 7-10. Furthermore, Keegan et al specifically teaches that "acacia gum" has the property of swelling (col. 1 lines 10-16) and Bredt et al 798 specifically teaches that "acacia gum" may be used as the adhesive for a 3-D printing method. See page 10 line 9 to page 11 line 3, and especially page 10 line 30. In other words, Bredt et al 798 teaches using a powder adhesive (acacia gum) which swells when wetted with water.

With respect to Nagai, this reference suggests a starch adhesive may comprise a mixture of cationic starch and anionic starch (col. 2 lines 44-54); it being noted that Bredt et al 798 teaches that starch may be used as the particulate adhesive for the 3-D printing method. See page 10 line 9 to page 11 line 3, and especially page 10 lines 30-31.

With respect to Keegan and Nagai, Bredt et al 798 teaches a method for forming a three dimensional printing using known fluid activated particulate material as the adhesive wherein known adhesives include fluid activated particulate material comprising a first and second reactant as evidence by Keegan et al or Nagai et al. The suggestion to look to the adhesive art for an adhesive comprising particles which are activated by fluid is found in Bredt et al 798 instead of the secondary art to Keegan et al or Nagai et al.

With respect to Thuresson, applicant argues that Thuresson teaches an aqueous composition rather than a particulate material. Applicant is incorrect since Thuresson teaches using the combination of water soluble polyelectrolyte and water soluble cationic polyelectrolyte in sanitary products such as nappies, sanitary towels, and the like. See col. 6 lines 43-53. One of ordinary skill in the art would readily understand that a sanitary product containing Thuresson's composition would be in a dry state prior to use by a consumer. Motivated by the desire found in Bredt et al 798 to obtain a dramatic viscosity increase as the fluid dissolves the adhesive (page 9 lines 1-4), one of ordinary skill in the art would have found it obvious to add Thuresson's particulate composition to Bredt et al '798's particulate composition to obtain the unexpectedly high viscosity increase disclosed by Thuresson.

Van Der Geest

6) **Claims 85-90, 92, 94, 96, 98 and 124-129 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Der Geest (WO 98/51477) in view of Clarke et al (US 4476190), or Japan 683 (JP 3-287683) and Nagai et al (US 5096491).**

WO 98/51477 corresponds to US 6403002 cited by applicant in the IDS filed 6-11-04.

Van der Geest substantially discloses the claimed invention except that Van der Geest does not specifically recite that the binder comprises "first reactant" and "second reactant". However, it would have been obvious to one of ordinary skill in the art to provide Van der Geest's binder as a "free-flowing particulate material comprising a first reactant and a second reactant" as claimed in view of (1) Van der Geest's teaching that

the binder *for the "method of 3-D printing"* may be **wallpaper adhesive powder** (page 4) and (2) (a) Clarke et al's teaching of an **adhesive for wallpaper** comprising anionic particles and cationic particles or (b) Japan 683's teaching of an **adhesive for wallpaper** comprising starch powder wherein Nagai et al teaches that starch adhesive may comprise a mixture of cationic starch and anionic starch (col. 2 lines 23-54).

As to claims 127-129, Van der Geest teaches using filler such as metal powder in addition to the adhesive powder, using a particle size of 25-250 micrometers and using water as the fluid.

Applicant argues that one of ordinary skill in the at would find no motivation to use the powder of Clarke's composition as the wallpaper adhesive powder recited by Van der Guest since Clarke's particles swell and hardening times would be greatly increased. This argument is not persuasive since (1) Van der Geest teaches using "wallpaper adhesive powder" which is activated by water in the disclosed 3-D printing method of making a shaped body and (2) Clarke et al's powder is a wallpaper adhesive powder which is activated by water. In other words, applicant's swelling argument is inconsistent with Van der Geest's teaching to use "wallpaper adhesive powder".

Applicant argues that Clarke teaches against a reaction between cationic and anionic polymers since the two forms of polymer do not interact with one another in the liquid dispersion. The examiner agrees that Clarke teaches against prematurely activating the polymer particles with water. The liquid in the dispersion mentioned by applicant is non-aqueous (not water) because it is used to apply the particles to the wallpaper to form prepasted wallpaper. When it is desired to apply the prepasted

wallpaper, water is applied to the coating to activate the polymers. With respect to applying water to the polymers, Clarke teaches "the particles will stick to each other and interact" (col. 3 lines 43-45). Clarke also describes "some chemical interaction" between the particles when the water is applied. See col. 4 lines 18-26.

With respect to Harai (Japan 683), applicant apparently agrees that Van der Geest teaches using wallpaper adhesive powder and that Haria teaches using starch powder as wall paper adhesive.

With respect to Nagai, applicant argues that Nagai does not teach a mixture of cationic starch and anionic starch. The examiner disagrees since Nagai et al teaches using a mixture of starches and expressly identifies both cationic starch and cationic starch. Se col. 2 lines 44-50.

Applicant argues that Nagai is silent regarding any reaction between these two starches. More properly, Nagai teaches that starches provide strong adhesion (bonds) in a short period of time.

Remarks

7) Applicant's arguments filed 10-28-05 have been fully considered but they are not persuasive. Applicant's arguments are addressed in body of the respective rejections.

8) Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9) Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven D. Maki whose telephone number is (571) 272-1221. The examiner can normally be reached on Mon. - Fri. 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Steven D. Maki
February 18, 2006

Steven D. Maki
STEVEN D. MAKI 2-18-06
PRIMARY EXAMINER